

IDAHO DEPARTMENT  
OF HEALTH AND WELFARE  
DIVISION OF  
ENVIRONMENTAL QUALITY

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## Explanation of Significant Differences

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# Explanation of Significant Differences for the Record of Decision for the Central Facilities Area Operable Unit 4-13

At the Idaho National Engineering and Environmental Laboratory  
Idaho Falls, Idaho

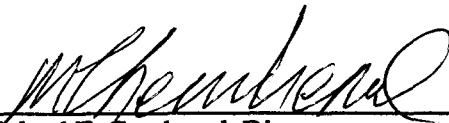
**Explanation of Significant Differences to the  
Record of Decision for the Central Facilities Area  
Operable Unit 4-13**

**May 2003**

Prepared for the  
U.S. Department of Energy  
Idaho Operations Office

## Signature Sheet

Signature sheet for the *Explanation of Significant Differences to the Record of Decision for Central Facilities Area Operable Unit 4-13* at the Idaho National Engineering and Environmental Laboratory, between the U.S. Department of Energy and the U.S. Environmental Protection Agency, with concurrence by the Idaho Department of Environmental Quality.

  
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Michael F. Gearheard, Director  
Environmental Cleanup Office  
EPA

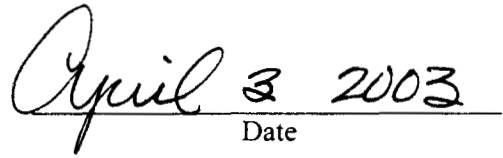
  
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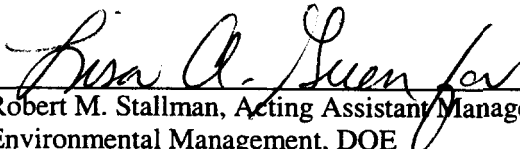
C. Stephen Allred, Director  
IDEQ



April 3 2003  
Date

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Robert M. Stallman, Acting Assistant Manager  
Environmental Management, DOE

4-29-03

Date



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## ACRONYMS

CEL	Chemical Engineering Laboratory
CFA	Central Facilities Area
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FRG	final remediation goal
ICDF	INEEL CERCLA Disposal Facility
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
OU	operable unit
ROD	Record of Decision
WAG	waste area group



# **Explanation of Significant Differences to the Record of Decision for the Central Facilities Area Operable Unit 4-13**

## **1. INTRODUCTION**

This Explanation of Significant Differences (ESD) applies to the *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13* (DOE-ID 2000a). The U.S. Department of Energy Idaho Operations Office (DOE-ID); the U.S. Environmental Protection Agency (EPA), Region 10; and the Idaho Department of Health and Welfare signed the Record of Decision (ROD) in July 2000.

This ESD—prepared in accordance with Section 117(c) of the “Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)” (42 USC § 9601 et seq.) and 40 CFR 300.435(c)(2)(i), “Community Relations”—documents differences to the selected remedy’s scope for the Central Facilities Area (CFA) -04 mercury pond remedial action in the ROD. In summary, this ESD increases the final remediation goal (FRG) for the CFA-04 mercury pond remedial action from 0.5 mg/kg to 8.4 mg/kg and eliminates the requirement to backfill the pond with clean soil to the surrounding grade. These changes do not increase risk to ecological or human receptors, and the ROD remains protective and continues to meet applicable or relevant and appropriate requirements. The Idaho Department of Environmental Quality (IDEQ) and the EPA support the need for this ESD.

This ESD will become part of the Idaho National Engineering and Environmental Laboratory (INEEL) administrative record (40 CFR 300.825[a][2], “Record Requirements after the Decision Document is Signed”). The INEEL administrative record is available to the public at the following locations:

INEEL Technical Library  
DOE Public Reading Room  
1776 Science Center Drive  
Idaho Falls, ID 83415  
(208) 526-1185

Albertson’s Library  
Boise State University  
1910 University Drive  
Boise, ID 83725  
(208) 385-1621

University of Idaho Library  
University of Idaho Campus  
434 2nd Street  
Moscow, ID 83843  
(208) 885-6344

## 2. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, AND SELECTED REMEDY

The INEEL—managed by the U.S. Department of Energy (DOE)—is a government facility located 51 km (32 mi) west of Idaho Falls, Idaho, and occupies 2,305 km<sup>2</sup> (890 mi<sup>2</sup>) of the northeastern portion of the Eastern Snake River Plain. The CFA is in the south-central portion of the INEEL.

Facilities at the INEEL are dedicated primarily to nuclear research and waste management. The Bureau of Land Management manages the surrounding areas for multipurpose use. A 13-km<sup>2</sup> (5-mi<sup>2</sup>) buffer zone, which is used for cattle and sheep grazing, surrounds the central area within the INEEL. Communities nearest to the CFA are Atomic City (south), Arco (west), Butte City (west), Howe (northwest), Mud Lake (northeast), and Terreton (northeast).

The original buildings at CFA (built in the 1940s and 1950s) housed Navy gunnery range personnel, administration, shops, and warehouse space. The facilities have been modified over the years to fit changing needs and now provide four major types of functional space: (1) craft, (2) office, (3) service, and (4) laboratory. Approximately 1,028 people work at CFA. Security personnel strictly control public access to the INEEL and CFA.

The Snake River Plain Aquifer, which is the largest potable aquifer in Idaho, underlies the Eastern Snake River Plain and the INEEL. The aquifer is approximately 322 km (200 mi) long, 32 to 97 km (20 to 60 mi) wide, and covers an area of approximately 25,000 km<sup>2</sup> (9,600 mi<sup>2</sup>). The depth to the aquifer varies from approximately 61 m (200 ft) in the northeastern corner of the INEEL to approximately 274 m (900 ft) in the southeastern corner, a distance of 68 km (42 mi). Depth to groundwater is approximately 146 m (480 ft) below CFA. Drinking water for employees at CFA is obtained from production wells in the northeastern part of the facility.

To better manage environmental investigations, the INEEL is divided into 10 waste area groups (WAGs). Fifty-two known or suspected contaminant release sites were identified within the CFA WAG (i.e., WAG 4), 45 of which were recommended for no action. Institutional controls are still being maintained at four action sites that were remediated. The CFA-04 mercury pond is one of three additional sites in WAG 4 to be remediated in accordance with the Operable Unit (OU) 4-13 ROD (DOE-ID 2000a) in the near future.

The CFA-04 pond is a shallow, unlined surface depression that originally was a borrow pit for construction activities at the CFA. It is approximately 152 × 46 m (500 × 150 ft) and roughly 2 to 2.4 m (7 to 8 ft) deep; basalt outcrops are present within and immediately adjacent to the pond. It received laboratory waste from the Chemical Engineering Laboratory (CEL) in the CFA-674 building between 1953 and 1969. The CEL was used to conduct calcine experiments on simulated nuclear waste. (The calcining process later was used on actual nuclear waste at the INEEL to change the waste from a liquid to a solid and to effect an overall volume reduction.) The CEL experiments used mercury to dissolve simulated aluminum fuel cladding as well as radioisotope tracers in the calcining process. The primary waste streams discharged to the pond from the CEL included approximately 76.5 m<sup>3</sup> (100 yd<sup>3</sup>) of mercury-contaminated calcine that contained low-level radioactive waste and liquid effluent from the laboratory experiments. In addition, there is approximately 382 m<sup>3</sup> (500 yd<sup>3</sup>) of rubble, consisting of laboratory bottles, asphalt and asbestos roofing materials, reinforced concrete, and construction and demolition debris. The pond received run-off from the CFA site periodically between 1953 and 1995.

The remedial action objectives presented in the OU 4-13 ROD (DOE-ID 2000a) that are applicable to the CFA-04 pond are:

- Prevent ingestion and inhalation of radionuclide and nonradionuclide contaminants of concern that would result in a total excess cancer risk greater than 1 in 10,000 or a total hazard index greater than 1.0
- Prevent exposure of ecological receptors to contaminated soil with concentrations greater than or equal to a screening level of 10 times background values that result in a hazard quotient greater than or equal to 10.

The previous major components of the selected remedy presented in the OU 4-13 ROD (DOE-ID 2000a) for the CFA-04 pond were:

1. Characterizing the site and excavating soil from CFA-04 that exceeds the mercury FRG of 0.50 mg/kg. Soil contaminated at concentrations above the FRG will be excavated to 10 ft (below ground surface) or to basalt. No basalt will be excavated.
2. Transporting and disposing of soil that exceeds the mercury FRG to the proposed INEEL CERCLA Disposal Facility (ICDF).
3. Stabilizing soil with toxicity characteristic leaching procedure mercury concentrations greater than 0.2 mg/L using cement and verification that all land disposal restrictions are met.
4. Performing verification sampling to ensure that soil exceeding the FRG of 0.50 mg/kg mercury has been removed.
5. Backfilling the pond, and adjacent areas that have been excavated, with uncontaminated soil to grade or sloped to promote drainage. All excavations will be contoured to match the surrounding terrain and revegetation.

### 3. DESCRIPTION OF THE SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

The scope of the remedial action at the CFA-04 mercury pond is being changed with this ESD. The FRG is being increased from 0.5 mg/kg to 8.4 mg/kg. This increase in FRG meets the same risk targets for human health and the environment, as established in the OU 4-13 ROD (DOE-ID 2000a). The cleanup goal of 8.4 mg/kg is equally protective of the ecosystem and the public. The ROD selected remedy also is being changed from “backfilling of the pond to the surrounding grade with clean soil” to “backfilling the excavated area with clean soil and smoothing the grade.” The surrounding soil will be used to decrease the steepness of the grade and will provide a smooth transition from the higher surrounding grade. This change does not increase the risk to either the public or the environment.

The basis for the increase in FRG is documented in the *Re-evaluation of the Final Remediation Goals for Mercury at the CFA-04 (CFA-674 Pond)* (INEEL 2002). It was determined that a re-evaluation of the FRG for mercury (Hg) was appropriate for both human and ecological receptors after new information recently became available from EPA sources. Additional toxicity and fate and transport information, improved information on the chemical form of the mercury in the environment, and more realistic modeling became available for ecological receptors (EPA 1997a, 1999). New toxicity and fate and transport information, and improved information on the chemical form of the mercury in the environment, recently became available for human health (INEEL 2002; EPA 2001, 1997b). Based on this new available information for both human and ecological receptors, a more consistent and realistic approach to developing an FRG for Hg could be implemented.

Recalculated preremediation mercury hazard quotients using modeling of the new input values are compared with the original ROD hazard quotients (see Table 7-4 in the ROD [DOE-ID 2000a]) in Table 3-1. The recalculated hazard quotients are lower. Risks for developing cancer were not calculated since mercury is noncarcinogenic and slope factors are not available.

Table 3-1. Comparison of major preremediation mercury hazard quotients at CFA-04 based on remodeling using an exposure point concentration of 74 mg/kg.<sup>a</sup>

Site	Contaminant of Concern	Exposure Pathway	Record of Decision Hazard Quotient	Recalculated Hazard Quotient
<u>Future Residential Exposure Scenario</u>				
CFA-04	Mercury	Ingestion of homegrown produce	80	7.56
<u>Ecological Risk Assessment</u>				
CFA-04	Mercury	Ecological exposure	<1 to 30,000	<1 to 210
a. An exposure point concentration of 74 mg/kg (see Table D-7 of the <i>Comprehensive Remedial Investigation/Feasibility Study for the Central Facilities Area Operable Unit 4-13 at the Idaho National Engineering and Environmental Laboratory</i> [DOE-ID 2000b]) was used to calculate the ROD hazard quotient of 80. The exposure point concentration in the ROD is a misprint.				
CFA = Central Facilities Area				
ROD = Record of Decision				

A comparison of the new remediation goal with the previous goals in the ROD (see Table 9-1 of the ROD [DOE-ID 2000a]) is included in Table 3-2 and is presented in detail in the *Re-evaluation of the Final Remediation Goals for Mercury at the CFA-04 (CFA-674 Pond)* (INEEL 2002). The previous ecological FRG of 0.5 mg/kg mercury was based on a screening value of 10 times the background level of mercury found at the INEEL. For the new ecological goal of 8.4 mg/kg mercury, hazard quotients were calculated for a mercury exposure point concentration of 74 mg/kg with 0.5% expected to be in the form of methyl mercury. Methylation of mercury is a concern due to its greater toxicity and mobility in the environment than inorganic mercury. A small percentage of methyl mercury (0.008%) was found in one of six samples

during subsequent field sampling (DOE-ID 2003). The new human health goal of 9.4 mg/kg mercury was developed using new EPA modeling input parameters and recently available toxicity values for the 0.5% methyl mercury. Ingestion of homegrown produce is the only exposure pathway of concern for human health. The new, recalculated ecological and human health remediation goals are consistent with the remedial action objectives for the CFA-04 pond. The new FRG of 8.4 mg/kg results in a hazard quotient less than 10 for ecological receptors except for terrestrial plants and less than 1 for human receptors (INEEL 2002). An ecological hazard quotient of 24 for terrestrial plants is acceptable since there is uncertainty related to the toxicity value and the size of the site is less than 3 acres.

Table 3-2. Comparison of remediation goals (mg/kg) for mercury at CFA-04.

Type of Remediation Goal	Previous Final Remediation Goals <sup>a</sup>	Basis	Recalculated Remediation Goals	Basis	New Final Remediation Goal
Ecological (hazard quotient <10.0 or 10 times background)	0.5	10 times background	8.4	Hazard quotient <10.0	8.4
Human health (hazard quotient <1.0 residential scenario)	1.27	Hazard quotient <1.0	9.4	Hazard quotient <1.0	8.4

a. The ecological final remediation goal is in the OU 4-13 ROD (DOE-ID 2000a).

DOE-ID = U.S. Department of Energy Idaho Operations Office

OU = operable unit

ROD = Record of Decision

With these changes, the new major components of the CFA-04 mercury pond selected remedy are:

1. Characterizing the site and excavating soil from CFA-04 that exceeds the mercury FRG of 8.4 mg/kg. Soil contaminated at concentrations above the FRG will be excavated to 10 ft (below ground surface) or to basalt. No basalt will be excavated.
2. Transporting and disposing of hazardous or radioactive soil that exceeds the mercury FRG to the ICDF. Transporting and disposing of nonhazardous and nonradioactive soil that exceeds the mercury FRG to the CFA landfills if the waste meets the facility's waste acceptance criteria.
3. Stabilizing soil with toxicity characteristic leaching procedure mercury concentrations greater than 0.2 mg/L at the ICDF's treatment facility using cement, verifying that all land disposal restrictions are met, and disposing of it at the ICDF.
4. Performing verification sampling to ensure that soil exceeding the FRG of 8.4 mg/kg mercury has been removed.
5. Backfilling the excavated area with clean soil and smoothing the grade. All excavations will be contoured to blend with the surrounding terrain and will be revegetated to match the surrounding vegetation.

In addition to being developed with the most recent uptake and toxicity values, the 8.4-mg/kg final remediation goal will result in less soil being removed from the pond. This will save approximately \$100K in remedial action costs. The CFA-04 remedial action will cost less while ensuring that the environment is being protected.

#### **4. AGENCY COMMENTS**

The IDEQ and the EPA have reviewed this ESD and support these changes to the selected remedy. The EPA's comments to provide more detail on the re-evaluation of the mercury FRG, the changes resulting from the revised remediation goal including cost savings, and specification of the CFA landfill as the other on-INEEL disposal facility were incorporated.



## **5. PUBLIC PARTICIPATION**

The INEEL will publish a notice of availability and a brief description of this ESD in the local newspaper (the Idaho Falls *Post Register*) and six other Idaho newspapers. The INEEL Community Relations Office may be contacted at (208) 526-4700 or (800) 708-2680. This meets the requirements in 40 CFR 300.435(c)(2)(i), “Community Relations.”

## **6. AFFIRMATION OF THE STATUTORY DETERMINATIONS**

After reviewing the proposed changes to the selected remedies, the DOE-ID, EPA, and the IDEQ believe that the remedies remain protective of human health and the environment, comply with federal and state requirements identified in the ROD as applicable or relevant and appropriate to these remedial actions at the time of the original ROD, and are cost-effective. In addition, permanent solutions and alternative treatment technologies are included in the revised remedies to the maximum practicable extent. The modified remedy satisfies the requirements of the “Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)” (42 USC § 9601 et seq.).

## 7. REFERENCES

- 40 CFR 300.435 (c)(2)(i), 2003, "Community Relations," *Code of Federal Regulations*, Office of the Federal Register, January 2003.
- 40 CFR 300.825(a)(2), 2003, "Record Requirements after the Decision Document is Signed," *Code of Federal Regulations*, Office of the Federal Register, January 2003.
- 42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*, December 11, 1980.
- DOE-ID, 2000a, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13*, DOE/ID-10719, Revision 2, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, July 2000.
- DOE-ID, 2000b, *Comprehensive Remedial Investigation/Feasibility Study for the Central Facilities Area Operable Unit 4-13 at the Idaho National Engineering and Environmental Laboratory*, DOE/ID-10680, Revision 1, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, July 2000.
- DOE-ID, 2003, *Waste Area Group 4 Remedial Design/Remedial Action Work Plan, CFA-04 Pond Mercury-Contaminated Soils, Operable Unit 4-13*, DOE/ID-11028, Revision 0, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, February 2003.
- EPA, 1997a, *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments—Interim Final*, U.S. Environmental Protection Agency Office of Solid Waste and Emergency Response, EPA 540-R-97-006, June 1997.
- EPA, 1997b, *Mercury Study Report to Congress, Volume III, Fate and Transport of Mercury in the Environment*, U.S. Environmental Protection Agency Office of Air Quality Planning and Standards and Office of Research and Development, EPA-452/R-97-005, December 1997.
- EPA, 1998, *Guidelines for Ecological Risk Assessment*, Office of Research and Development, Washington, D.C., EPA/630/R-95/002Fa, Federal Register, 63 FR 26946, Volume 63, May 14, 1998.
- EPA, 1999, *Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Peer Review Draft*, EPA/530-D-99-001A, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C., 1999.
- EPA, 2001, *Integrated Risk Information System (IRIS)*, U.S. Environmental Protection Agency, Duluth, Minnesota.
- INEEL, 2002, *Re-evaluation of the Final Remediation Goals for Mercury at the CFA-04 (CFA-674 Pond)*, INEEL/EXT-02-00747, Revision 0, Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, October 2002.